REMARKS

Applicant's counsel thanks Examiner Roy for her continued thorough and careful examination of the present application. Applicant's counsel is also appreciative of the very helpful and courteous telephone interview conducted May 14, 2003.

Claims 1, 12, 21 and 27 have been amended and new claims 33-38 have been added to more clearly describe the invention. No new matter is entered. Basis for the new claims can be found in the specification and claims as filed. Claims 25 and 31 have been cancelled.

During the interview, the independent claims 1, 12, 21 and 27 were discussed in view of the cited references. Applicant indicated that it would amend claims 1 and 12 as now presented. The substance of the interview is described in the following remarks. Claims 1 and 12 stand rejected under 35 USC § 102(b) as being anticipated by Dynys et al. ("Dynys"). As amended, claims 1 and 12 now positively recite that the optical interference coating has greater than 60 layers of alternating high- and low-index of refraction materials, *and* that the coating has "sufficiently low tensile stress such that said optical interference coating is not susceptible to cohesive failure from tensile stress." Dynys does not disclose an optical interference coating having greater than 60 layers and yet still having sufficiently low tensile stress as to not be susceptible to cohesive failure (i.e. so that it is not subject to mechanical failure from delamination or peeling or spalling off the coating). At col. 5 lines 61-67, Dynys discloses as follows:

> The total number of combined layers of silica and tantala is ideally as large as possible to obtain maximum optical performance, however, stress considerations must be balanced with optical performance. The total number therefore preferably ranges from 6 to 100. Stress considerations become a factor as 20 layers are reached, particularly as 60 layers are reached.

During the interview, the Examiner indicated that she would maintain the rejection of claims 1 and 12 bases solely on the above-quoted sentence: "The total number therefore preferably ranges from 6 to 100." Respectfully, this sentence alone cannot form the basis of an appropriate rejection under Section 102. As amended, the claims now *positively recite* that they are stable against cohesive failure *above 60 layers*. Read in context of the ***entire Dynys patent*** as is required for a proper rejection, the sentence merely stands for the proposition that more layers is better. Applicant does not dispute that Dynys discloses that it is desirable to provide as many alternating tantala/silica layers as possible. In fact, Dynys explicitly says this in the first above-quoted sentence. Along these lines, Dynys further teaches that it is *preferable* to have 8-100 layers; i.e. that this would be ***ideal***. However, reading on, Dynys *further explicitly recites, **in the same paragraph and in the same context*** that "stress

considerations must be balanced with optical performance," and that "stress considerations become a factor as 20 layers are reached." Therefore, according to Dynys, even at 20 layers stress considerations cannot be discounted. Dynys goes on to state that such stress considerations are of ***particular consequence*** as 60 layers are reached.

Therefore, a fair reading of Dynys is that that reference discloses a method of providing an optical interference coating of alternating tantala/silica layers where stress considerations become particularly pronounced approaching 60 layers. Above 60 layers ***Dynys provides no fair teaching or suggestion that the optical interference coating is sufficiently free from stress as to avoid cohesive failure***. The fact that Dynys provides no teaching regarding tensile stresses in its optical interference coating is supported by looking to the only example provided in Dynys at cols. 7-8. In the example only 35 layers are provided, *substantially less than 60* at which Dynys explicitly discloses stress has already become a major factor.

During the interview the Examiner indicated that her position was that Dynys *inherently discloses* that the optical interference coating would be mechanically stable, i.e. that it would have sufficiently low tensile stress, to avoid cohesive failure at greater than 60 layers, citing the sentence referring to "preferably 8 to 100 layers" as the sole support for this position. However, as previously discussed, the "preferable" 100 layers is not supported in the disclosure as being stable against cohesive failure or as having low tensile stress. At best, Dynys discloses that beyond 60 layers stress considerations are of *particular concern*, but that "ideally" the greater number of layers the better. The up to 100 layers recitation in Dynys, read in this clear context, is simply a numerical restatement of that "ideally" the greatest possible number of layers would be used.

To sustain a rejection based on inherence, the Examiner has the burden of providing some factual basis or other convincing technical reasoning to support inherency.

> The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. ...."In relying upon the theory of inherency, the examiner must provide basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art."

MPEP § 2112, citing *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original).

Here, the allegedly inherent characteristic, low tensile stress above 60 layers, ***cannot be said to necessarily flow from the teachings of Dynys***. Quite the contrary, if there is any inherent disclosure from the above-quoted passage in Dynys, it is that beyond 60 layers the

coating becomes *unstable and subject to cohesive failure*, ***and not*** that the coating is stable up to 100 layers. As stated above, the Examiner's position during the interview was that Dynys' coating would *inherently* have low tensile stress above 60 layers. This position *is against the clear teaching in Dynys* that above 60 layers, stress considerations are "particularly" severe. Therefore, it cannot be said that stability against cohesive failure above 60 layers is *inherent* in Dynys because it cannot be said from that reference that this property recited in claims 1 and 12 "necessarily flows from the teachings of" Dynys. *Cf.* MPEP §2112 cited *supra*.

Hence, Applicant respectfully submits that as amended herein claims 1 and 12 are not anticipated by Dynys at least because there is no teaching in that reference, either explicit *or inherent*, that the coating has "sufficiently low tensile stress such that said optical interference coating is not susceptible to cohesive failure" **despite** having greater than 60 layers. Therefore, it is now believed that claims 1 and 12 should be allowable over the cited references.

Claims 21 and 27 have been rejected under 35 USC § 102(b) as being anticipated by Krisl et al. ("Krisl"). During the interview the Examiner suggested (and the Applicant has now agreed) to amend claims 21 and 27 to recite a number of layers of alternating high/low index of refraction materials. Accordingly, these claims are now amended "greater than 51" layers of alternating high- and low-index of refraction materials. As amended, these claims now overcome the rejection under Section 102(b) because Krisl does not anticipate an optical interference coating having "greater than 51" layers.

During the interview, these claims were also discussed in the context of Section 103(a) for obviousness over Krisl. The Examiner's position was that based on the disclosed ranges for a', b', c' and d' in Krisl (see Krisl, Fig. 1 and whole specification, more completely described below), one could achieve the ratio, r, being greater than 0.76 as recited in the claims. Respectfully, this position of the Examiner is believed to be improper and unable to support a valid rejection under Section 103(a). To understand the Examiner's reasoning, it is first necessary to understand exactly what a', b', c' and d' are, and how they relate to layer thickness in the optical interference coating of Krisl. From Krisl at Fig. 1, and col. 5 lines 12-42, L and H are define to refer respectively to low and high index of refraction materials, are further defined to be equal in *optical thickness* to one quarterwave of the stack wavelength. This means, taking the example of Fig. 1 having the stack, λ_3, with seven alternating high- and low-index of refraction layers, that H and L are each defined as having an *optical thickness* equal to one quarter wavelength *for the entire stack,* λ_3. Therefore, before one can know what the *optical thickness* of L or H is, one must first know what the

optical wavelength for the entire finished stack will be.

Once the optical wavelength of the stack is known, the values of a', b', c' and d' are selected (either manually or by computer optimization) to provide a stack λ_3 that will have the desired reflective/refractive characteristics. According to Krisl, the values for a', b', c' and d' are selected based on considerations of reflective/refractive properties for the resulting finished stack, λ_3, and _no mention or consideration_ is given to mechanical properties such as internal tensile stresses in the stack. Once the values of these variables are selected, their reciprocals (i.e. 1/a', etc.) are then multiplied by ¼ stack wavelength (previously determined) in order to obtain the *optical thickness* for each of the respective layers. Finally, *physical thickness* is calculated for each layer by dividing its *optical thickness* by its *refractive index*.

This entire calculation is performed in Krisl _without any consideration paid or **even mentioned whatsoever**_ regarding tensile stresses in the resulting stack, λ_3. Therefore, in order to be able to select appropriate values for a', b', c' and d' to achieve a ratio greater than 0.76 as claimed, first an appropriate value for the stack wavelength must be selected, seemingly randomly. Then, values for these four variables must be selected, again randomly, so that the resulting stack, λ_3, will have a ratio of high- to low-index of refraction materials, r, greater than 0.76 as claimed once all the above calculations have been completed.

It is noted that _all of the above calculations_, including selection of the final stack wavelength and selection of the values for a', b', c' and d', must be carried out absent any consideration given to tensile stress whatsoever, because _**there is absolutely no motivation from Krisl**_ that stresses should even be considered. This is the flaw in the Examiner's reasoning. Even though it may be *possible* to select appropriate values of the above variables to achieve the claimed result, such selection in this case is necessarily made in hindsight having applicant's specification in view and is not motivated by any teaching, either explicit or inherent, from Krisl that the optical and physical thicknesses of its alternating layers can or even should be manipulated in this manner to achieve this result.

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there _must be some suggestion or motivation_, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a _reasonable expectation of success_. Finally, the prior art reference...must teach or suggest all the claim limitations.

MPEP § 706.02(j) (emphasis added).

First, as outlined above there is _absolutely no suggestion or motivation_ to vary the ratio of material thicknesses as a means to achieve low tensile stress and prevent cohesive

failure. As the Examiner has recognized, Krisl discloses these thickness can be varied only to achieve a desired *refractive or optical result*, and makes no mention of tensile stress. Second, there _can be no reasonable expectation of success_ because neither Krisl nor any generally known principal at the time the invention was made pointed to the above ratio as outcome-determinative or result-effective for tensile stresses in the finished coating. It is improper for the Examiner to argue that the thicknesses in Krisl can be optimized to achieve the claimed result because only result-effective variables can be optimized and ***Krisl nowhere teaches or suggests layer thicknesses as affecting tensile stress of the finished coating***. MPEP § 2144.05(II)(B).

Therefore, in view of the foregoing claims 21 and 27 as amended, each of which now positively reciting *both* greater than 51 layers *and* the ratio, r, greater than 0.76, patentably define over Krisl because that reference does not explicitly or inherently teach or suggest this combination of limitations. Regarding Dynys, that reference does not disclose or suggest any ratio for the alternating high- and low-index of refraction materials. Accordingly, it is now believed that claims 21 and 27 are patentable over all the cited references.

Applicant has also added new claims 33-38 as indicated during the telephone interview. As discussed during the interview, these claims are also believed to be independently allowable over the cited references.

The rejections of claims 1, 12, 21 and 27 all having been overcome, it is respectfully submitted these claims are now in condition for allowance. All remaining claims are dependent claims and should also be allowable as such.

Should the Examiner have any questions or concerns with respect to the instant submission, the Examiner is cordially invited to contact Applicant's undersigned counsel at the phone number listed below.

If there are any fees required by this communication not covered by an enclosed check, please charge such fees to our Deposit Account No. 16-1820, Order No. 32575.

Respectfully submitted,

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IN THE CLAIMS:

Please amend claims 1 and 12 as follows:

1. (twice amended) An optical interference coating for reflecting infrared radiation and transmitting visible light comprising alternating layers of high index of refraction material and low index of refraction material, ~~wherein~~ the total number of said layers ~~is~~ being greater than ~~51~~60, said optical interference coating having sufficiently low tensile stress such that said optical interference coating is not susceptible to cohesive failure from tensile stress, each of said alternating layers of high index of refraction material and low index of refraction material being a separate and distinct layer from adjacent layers.

12. (twice amended) An electric lamp comprising a light transmissive envelope containing an electric light source within, wherein at least a portion of said envelope is coated with an optical interference coating for reflecting infrared radiation and transmitting visible light radiation, said coating comprising alternating layers of high index of refraction material and low index of refraction material, ~~wherein~~ the total number of said layers ~~is~~ being greater than ~~51~~60, said optical interference coating having sufficiently low tensile stress such that said optical interference coating is not susceptible to cohesive failure from tensile stress, each of said alternating layers of high index of refraction material and low index of refraction material being a separate and distinct layer from adjacent layers.

21. (amended) An optical interference coating for reflecting infrared radiation and transmitting visible light comprising alternating layers of high index of refraction material and low index of refraction material, each of said alternating layers of high index of refraction material and low index of refraction material being a separate and distinct layer from adjacent layers, the total number of said layers of high index of refraction material and low index of refraction material being greater than 51, wherein a ratio of the total thickness of all of the layers of high index of refraction material to the total thickness of all of the layers of low index of refraction material, r, is greater than 0.76.

27. (amended) An electric lamp comprising a light transmissive envelope containing an electric light source within, wherein at least a portion of said envelope is coated with an optical interference coating for reflecting infrared radiation and transmitting visible light radiation, said coating comprising alternating layers of high index of refraction material and

low index of refraction material, each of said alternating layers of high index of refraction material and low index of refraction material being a separate and distinct layer from adjacent layers, the total number of said layers of high index of refraction material and low index of refraction material being greater than 51, wherein a ratio of the total thickness of all of the layers of high index of refraction material to the total thickness of all of the layers of low index of refraction material, r, is greater than 0.76.